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## DRY CLEANING DETERGENT

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[There are no amendments to this patent.]

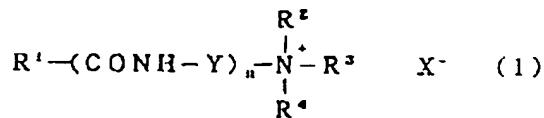
Abstract (with corrections)

Problem

To provide a dry cleaning detergent having excellent water solubilizing capability and which can be used in the preparation of a uniform sasara [transliteration] liquid when using a petroleum solvent.

Solving means

A dry cleaning detergent containing (A) a quaternary ammonium salt of general formula (1), (B) a sorbitan fatty acids ester, (c) a polyoxyethylene sorbitan fatty acid esters, and (D) a petroleum solvent.



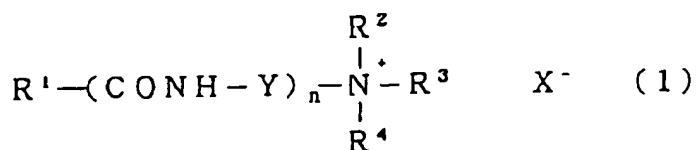
(where  $R^1$  is a  $C_{8-22}$  alkyl group,  $R_2$  is a  $C_{1-22}$  alkyl or hydroxyalkyl group,  $R_3$  and  $R_4$  are  $C_{1-3}$  alkyl or hydroxyethyl groups,  $Y$  is an ethylene or propylene group,  $n$  is 0 or 1, and  $X^-$  is an anion group).

Claim

1. A dry cleaning detergent containing:

(A) a quaternary ammonium salt of the following general formula (1):

[Structure 1]



(where  $R^1$  is a  $C_{8-22}$  alkyl group,  $R^2$  is a  $C_{1-22}$  alkyl or hydroxyalkyl group,  $R^3$  and  $R^4$  are  $C_{1-3}$  alkyl or hydroxyalkyl groups,  $Y$  is an ethylene or propylene group,  $n$  is 0 or 1, and  $X^-$  is an anion group),

- (B) a sorbitan fatty acid ester,
- (C) a polyoxyethylene sorbitan fatty acid ester, and
- (D) a petroleum solvent

#### Detailed explanation of the invention

[0001]

##### Technical field of the invention

The present invention relates to a dry cleaning detergent using a petroleum solvent as a washing medium.

[0002]

##### Prior art

In dry cleaning using a petroleum solvent consisting of a mixture of paraffin hydrocarbons, naphthene hydrocarbons, aromatic hydrocarbons and so on, a variety of surfactants have been used in order to remove water-soluble dirt or solid dirt, to prevent resoiling, to inhibit electrostatic charging, and to render softening capability. In general, the dry cleaning detergent is a liquid detergent obtained by the blending of 5-80 wt% of a surfactant, a petroleum solvent, a viscosity reducing agent, a corrosion inhibitor, etc. During dry cleaning, this liquid detergent is used at a ratio of 0.1-5 vol. % with respect to the petroleum solvent.

[0003]

However, in drying cleaning using a petroleum solvent, it is common that, prior to washing in a dry cleaning machine, in order to remove water-soluble dirt or stains which come off with difficulty by washing, a spray or brushing treatment with a treatment liquid is carried out and then washing is conducted. The common recipe of this treatment liquid is petroleum solvent/dry cleaning detergent/water = 8/1/1 (volume ratios). In general, this treatment liquid is called a sasara liquid.

[0004]

When a uniform sasara liquid cannot be prepared, the amount of water blended is decreased. There is a problem in that the effectiveness in removing water-soluble dirt is low. In order to prepare a uniform sasara liquid, it is required for the dry cleaning detergent using a petroleum solvent to have a high water solubilizing capability.

[0005]

Problems to be solved by the invention

Therefore, a dry cleaning detergent having excellent water solubilizing capability and which can be used for preparation of a uniform sasara liquid with respect to a petroleum solvent is highly desired.

[0006]

Means to solve the problems

As a result of zealous investigations on a dry cleaning detergent that can be used for the preparation of a uniform sasara liquid, the present inventors have discovered that a composition containing specific cationic surfactant and nonionic surfactant is appropriate for this objective. The present invention has been accomplished.

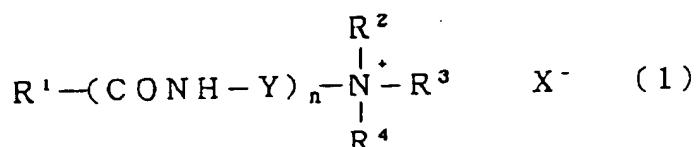
[0007]

In other words, the present invention provides a dry cleaning detergent containing:

(A) a quaternary ammonium salt of the following general formula (I):

[0008]

[Structure 2]



[0009]

(where  $R^1$  is a  $C_{8-22}$  alkyl group,  $R^2$  is a  $C_{1-22}$  alkyl or hydroxyalkyl group,  $R^3$  and  $R^4$  are  $C_{1-3}$  alkyl or hydroxyalkyl groups,  $Y$  is an ethylene or propylene group,  $n$  is 0 or 1, and  $X^-$  is an anion group),

- (B) a sorbitan fatty acid ester,
- (C) a polyoxyethylene-sorbitan fatty acid ester, and
- (D) a petroleum solvent

[0010]

[Embodiments of the invention]

Component (A) of the present invention is a quaternary ammonium salt represented by the general formula (1). As the preferred component (A), stearyl dimethylethyl ammonium-

monoethyl sulfuric acid salt, stearyl dimethylhydroxyethyl ammonium-glycolic acid salt, stearyl dimethylhydroxyethyl ammonium-p-toluene sulfonic acid salt, stearoyl aminoethyl dimethylhydroxyethyl ammonium-p-toluene sulfonic acid salt, and so on are examples. Furthermore,  $X^-$  in the general formula (1) is an anion group derived from nitric acid, sulfuric acid, phosphoric acid, p-toluene sulfonic acid, methyl sulfate, ethyl sulfate, glycolic acid, etc.

[0011]

Component (B) of the present invention is a sorbitan fatty acid ester, preferably with an HLB value of 4-10 or so. Sorbitan monolaurate (HLB = 8.6) is an example.

[0012]

The polyoxyethylene sorbitan fatty acid ester of component (C) of the present invention is a material preferably with an HLB value of 10-20 or so. Polyoxyethylene sorbitan monolaurate (the number of moles of ethylene oxide added = 6-20), polyoxyethylene sorbitan monopalmitate (the number of moles of ethylene oxide added = 6-20), polyoxyethylene sorbitan monostearate (the number of moles of ethylene oxide added = 6-20), polyoxyethylene sorbitan tristearate (the number of moles of ethylene oxide added = 6-20), polyoxyethylene sorbitan monooleate (the number of moles of ethylene oxide added = 6-20), polyoxyethylene sorbitan trioleate (the number of moles of ethylene oxide added = 6-20), and so on are examples.

[0013]

There are no special restrictions on the petroleum solvent of component (D) of the present invention. It is possible to mention those including paraffin hydrocarbons (boiling points 120-220°C), naphthene hydrocarbons, or aromatic hydrocarbons commonly used as dry cleaning solvents.

[0014]

It is preferable that the composition of the present invention contains previously mentioned (A), (B), (C), and (D) at 5-20 wt%, 20-50 wt%, 5-20 wt%, and 30-70 wt%, especially 7-11 wt%, 28-32 wt%, 8-12 wt%, and 45-57 wt%, respectively. In this range, a composition that can be used for preparation of a sasara liquid that is stable, uniform, and has excellent water solubilizing capability can be obtained.

[0015]

In addition to these necessary components in the dry cleaning detergent of the present invention, as agents for improving the liquid stability during storage and for reducing the viscosity, methanol, ethanol, isopropanol, butanol and other lower alcohols, butyl Cellosolve, other alcohol ethers, and so on can be blended. It is also possible to blend benzotriazole or other metal corrosion inhibitors, antibacterial agents, water, etc.

[0016]

Application examples

Application Examples 1-8 and Comparative Examples 1-5

Dry cleaning detergents with the compositions shown in Tables 1 and 2 were prepared. Water solubilizing capabilities were tested. The numerical values for the compositions in Tables 1 and 2 are shown as wt%. The results are shown in Tables 1 and 2.

[0017]

Water solubilizing capability test

State during mixing

A material with a ratio of a dry cleaning petroleum solvent (Exxon D-40, manufactured by Exxon Chemical Co. Ltd.)/dry cleaning detergent/ion-exchanged water = 8 mL/1 mL/1 mL was placed in a test tube. The state during good shaking and mixing was observed by visual inspection. Since transparency during mixing is a condition for ease of preparation of a sasara liquid, the evaluation was judged by consideration of this point according to the following criteria:

O: Transparent during mixing

Δ: Translucent during mixing

X: Opaque during mixing

(2) Water solubilization amount

In a 200-mL emulsification test tube, 100 mL of Exxon D-40 and 1 mL of a dry cleaning detergent were placed. After stirring, while ion-exchanged water was being added in a small amount with a microsyringe, it was stirred vigorously each time. After stirring, it was allowed to stand and was observed by visual inspection. The amount of ion-exchanged water until the solution had a white turbidity was the maximum solubilization amount (mL).

[0018]

Table 1

(2)

(1) 配合量(重量%)	実施例							
	1	2	3	4	5	6	7	8
(3)ステアリルジメチルエチルアンモニウム・モノエチル硫酸塩	10	10	10	10				
(A)(4)ステアリルジメチルヒドロキシエチルアンモニウム・グリコール酸塩					10		10	
(5)ステアリルジメチルヒドロキシエチルアンモニウム・パラトルエンスルホン酸塩						10		10
(B)(6)ソルビタンモノラウレート	30	30	30	30	30	30	30	30
(7)ポリオキシエチレンソルビタンモノラウレート(EO付加モル数=20)	10				10	10		
(8)ポリオキシエチレンソルビタンモノパルミテート(EO付加モル数=20)		10					10	
(C)(9)ポリオキシエチレンソルビタンモノステアレート(EO付加モル数=6)			10					10
(10)ポリオキシエチレンソルビタントリオレート(EO付加モル数=20)				10				
(D)石油系溶剤 <sup>*1</sup> (11)	50	50	50	50	50	50	50	50
評価結果 混合時の状態(13)	○	○	○	○	○	○	○	○
水の可溶化量(mL)(14)	0.18	0.15	0.16	0.15	0.18	0.16	0.15	0.16

(15) \* 1: 日本石油株式会社製、商品名ナフテゾールL

Key: 1 Amounts added (wt%)  
 2 Application example  
 3 Stearyl dimethylethyl ammonium-monoethyl sulfuric acid salt  
 4 Stearyl dimethylhydroxyethyl ammonium-glycolic acid salt  
 5 Stearyl dimethylhydroxyethyl ammonium-p-toluene sulfonic acid salt  
 6 Sorbitan monolaurate  
 7 Polyoxyethylene sorbitan monolaurate (number of moles of EO added = 20)  
 8 Polyoxyethylene sorbitan monopalmitate (number of moles of EO added = 20)  
 9 Polyoxyethylene sorbitan monostearate (number of moles of EO added = 6)  
 10 Polyoxyethylene sorbitan trioleate (number of moles of EO added = 20)  
 11 Petroleum solvent<sup>\*1</sup>  
 12 Evaluation results  
 13 State during mixing  
 14 Water solubilization amount (mL)  
 \*1: Commercial product name Naphthezol L, manufactured by Nippon Petroleum Co., Ltd.

[0019]

Table 2

(2)

(1) 配合量(重量%)	比較例				
	1	2	3	4	5
(3)ステアリルジメチルエチルアンモニウム・モノエチル硫酸塩	10	10	10	10	10
(A)(4)ステアリルジメチルヒドロキシエチルアンモニウム・グリコール酸塩					
(5)ステアリルジメチルヒドロキシエチルアンモニウム・パラトルエンスルホン酸塩					
(B)(6)ソルビタンモノラウレート	40				
(7)ポリオキシエチレンソルビタンモノラウレート(EO付加モル数=20)		40			
(C)(8)ポリオキシエチレンソルビタンモノハルミテート(EO付加モル数=20)			40		
(9)ポリオキシエチレンソルビタンモノステアレート(EO付加モル数=6)				40	
(10)ポリオキシエチレンソルビタントリオレート(EO付加モル数=20)					40
(D)(11)石油系溶剤* <sup>1</sup>	50	50	50	50	50
評価結果 (12)混合時の状態 (13)	△	—* <sup>2</sup>	—* <sup>2</sup>	×	×
水の可溶化量(mL) (14)	0.05	—* <sup>2</sup>	—* <sup>2</sup>	0.02	0.02

(15)

\* 1: 日本石油株式会社製、商品名ナフテゾールL

\* 2: 成分物は固化し、均一透明な溶液とならない。

Key: 1 Amounts added (wt%)  
 2 Comparative Example  
 3 Stearyl dimethylethyl ammonium-monoethyl sulfuric acid salt  
 4 Stearyl dimethylhydroxyethyl ammonium-glycolic acid salt  
 5 Stearyl dimethylhydroxyethyl ammonium-p-toluene sulfonic acid salt  
 6 Sorbitan monolaurate  
 7 Polyoxyethylene sorbitan monolaurate (number of moles of EO added = 20)  
 8 Polyoxyethylene sorbitan monopalmitate (number of moles of EO added = 20)  
 9 Polyoxyethylene sorbitan monostearate (number of moles of EO added = 6)  
 10 Polyoxyethylene sorbitan trioleate (number of moles of EO added = 20)  
 11 Petroleum solvent\*<sup>1</sup>  
 12 Evaluation results  
 13 State during mixing  
 14 Water solubilization amount (mL)  
 15 \*1: Commercial product name Naphthezol L, manufactured by Nippon Petroleum Co., Ltd.  
 \*2: The composition solidified, and a uniform, transparent solution was not obtained.

[0020]

**Effect of the invention**

The dry cleaning detergent of the present invention is uniform, transparent, and has excellent phase stability. Furthermore, it has excellent water solubilizing capability. Therefore, it is possible to prepare a uniform sasara liquid with respect to a dry cleaning petroleum solvent.